

WHAT IS CLAIMED IS:

1. A steel for a high bearing pressure-resistant member, having a high machinability, said steel being formed of a machine structural steel comprising carbon in an amount ranging from 0.15 to 0.25% by weight, silicon in an amount of not less than 0.4 % by weight, nickel in an amount ranging from 1 to 3 % by weight, chromium in an amount ranging from 1.2 to 3.2 % by weight, and molybdenum in an amount ranging from 0.25 to 2.0 % by weight, said machine structural steel containing carbide precipitated under a heat treatment for spheroidizing, the carbide having an average particle size of not larger than 1 μm and the maximum particle size of not larger than 3 μm .
2. A steel as claimed in Claim 1, wherein said carbide contains at least one carbide selected from the group consisting of MC carbide, M_2C carbide, M_7C_3 carbide, M_{23}C_6 carbide, and M_6C carbide.
3. A steel as claimed in Claim 1, wherein said machine structural steel has a Vickers hardness ranging from 180 to 250 after undergoing the spheroidizing heat treatment.
4. A high bearing pressure-resistant member made of a steel which has a high machinability and is formed of a machine structural steel comprising carbon in an amount ranging from 0.15 to 0.25% by weight, silicon in an amount of not less than 0.4 % by weight, nickel in an amount ranging from 1 to 3 % by weight, chromium in an amount ranging from 1.2 to 3.2 % by weight, and molybdenum in an amount ranging from 0.25 to 2.0 % by weight, said machine structural steel containing carbide precipitated under a heat treatment for spheroidizing, the carbide having an average particle size of not larger than 1 μm and the maximum particle size of not larger than 3 μm ,

wherein said machine structural steel undergoes one of a first treatment and a second treatment after the spheroidizing heat treatment, said first treatment including hardening the machine structural steel by carburizing, and tempering the hardened machine structural steel, said second treatment including hardening the machine structural steel by carbonitriding, and tempering the hardened machine structural steel.

5. A method of producing a steel for a high bearing pressure-resistant member, having a high machinability, said method comprising:

preparing a machine structural steel comprising carbon in an amount ranging from 0.15 to 0.25% by weight, silicon in an amount of not less than 0.4 % by weight, nickel in an amount ranging from 1 to 3 % by weight, chromium in an amount ranging from 1.2 to 3.2 % by weight, and molybdenum in an amount ranging from 0.25 to 2.0 % by weight; and

applying a heat treatment for spheroidizing on said machine structural steel so that carbide is precipitated in said machine structural steel, the carbide having an average particle size of not larger than 1 μm and the maximum particle size of not larger than 3 μm .

6. A method as claimed in Claim 5, wherein the spheroidizing heat treatment includes

maintaining said machine structural steel at a temperature ranging from 700 to 820 °C;

cooling said machine structural steel to a temperature of 600 °C at a cooling rate of not higher than 20 °C per one hour.

7. A method of producing a high bearing pressure-resistant member, having a high machinability, said method comprising:

preparing a machine structural steel comprising carbon in an amount ranging from 0.15 to 0.25% by weight, silicon in an amount of not less than 0.4 % by weight, nickel in an amount ranging from 1 to 3 % by weight, chromium in an amount ranging
5 from 1.2 to 3.2 % by weight, and molybdenum in an amount ranging from 0.25 to 2.0 % by weight;

applying a heat treatment for spheroidizing on said machine structural steel so that carbide is precipitated in said machine structural steel, the carbide having an average particle size
10 of not larger than 1 μm and the maximum particle size of not larger than 3 μm ;

machining said machine structural steel to have predetermined shape and dimensions; and

applying one of a first treatment and a second treatment
15 on said machine structural steel after the machining, said first treatment including hardening said machine structural steel by carburizing, and tempering said hardened machine structural steel, said second treatment including hardening said machine structural steel by carbonitriding, and tempering said hardened machine
20 structural steel.